

LA-UR-21-30585

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Title: Triad ST&E Committee Meeting -Laboratory Update

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Intended for: Recording for Pre Meeting

Issued: 2021-10-25

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Triad ST&E Committee Meeting

Laboratory Update

John Sarrao

Deputy Director, Science, Technology & Engineering

Recorded Oct. 26 for Nov. 2 discussion

Topics for discussion

- Overall plan for meeting
- Lab Updates
 - Personnel changes
 - COVID and vaccination status
 - FY21 Performance
- What you told us last time (June 2021); Bob's Board briefing (10/20/21)
- FY22 Priorities
 - Strategic Priorities
 - Credible Capacity
 - Future of Work (and innovation & collaboration)
- Capability Stewardship
 - Capability review status

Agenda for Nov. 9-10 meeting

Tuesday, Nov. 9, 2021

Hybrid: JR Oppenheimer Center LANL, Jemez/Cochiti Rooms, TA-3, SM 207, via Webex

- 8:00 Opening Comments (*closed session*) Robert Powell
STE Committee Chairperson
- 8:15 Welcome and Plan for Meeting John Sarrao
Deputy Laboratory Director for Science, Technology, and Engineering
- 9:00 Workforce: Pipeline, Onboarding, Mentoring Nan Sauer
Office Director for Partnerships and Pipeline Office
- 10:00 Break
- 10:30 **Capability Reviews:**
- 10:30 SoS Capability Review Pat
Fitch
- 10:55 NPF Capability Review Mike Furlanetto
- 11:20 CNES Capability Review Pat Fitch
- 11:45 Break
- 12:00 Working Lunch with Division Leaders (*closed session*) - two sessions: one live, one virtual
Attendees: Divisions B, C, EES, MPA, MST, Sigma, AOT, P, T, CCS, HPC, A, ISR, NEN, M, AMPP, E, XCP
- 1:00 Break
- 1:15 **Capability Reviews cont.:**
- 1:15 ENG Capability Review Nancy Jo Nicholas
- 1:40 Materials Capability Review Andrew Dattelbaum
- 2:05 IS&T Capability Review Irene Qualters
- 2:30 Weapons Systems Capability Review Bob Putnam
- 2:55 Break
- 3:30 National Security Life Sciences Pat Fitch, Kirsten McCabe, Elizabeth Hong-Geller
TBD
- 4:00 Mars Science Roger Wiens
TBD
- 4:30 Executive Session (*closed session*) Robert Powell and Committee Members
- 5:30 Meeting Adjourns
- 6:00 Dinner: Pig n Fig (*by invitation*)
11 Sherwood Blvd., White Rock, NM

Committee Outbrief: Nov. 17

Wednesday, Nov. 10, 2021

Hybrid: JR Oppenheimer Center LANL, Jemez/Cochiti Rooms, TA-3, SM 207, via Webex

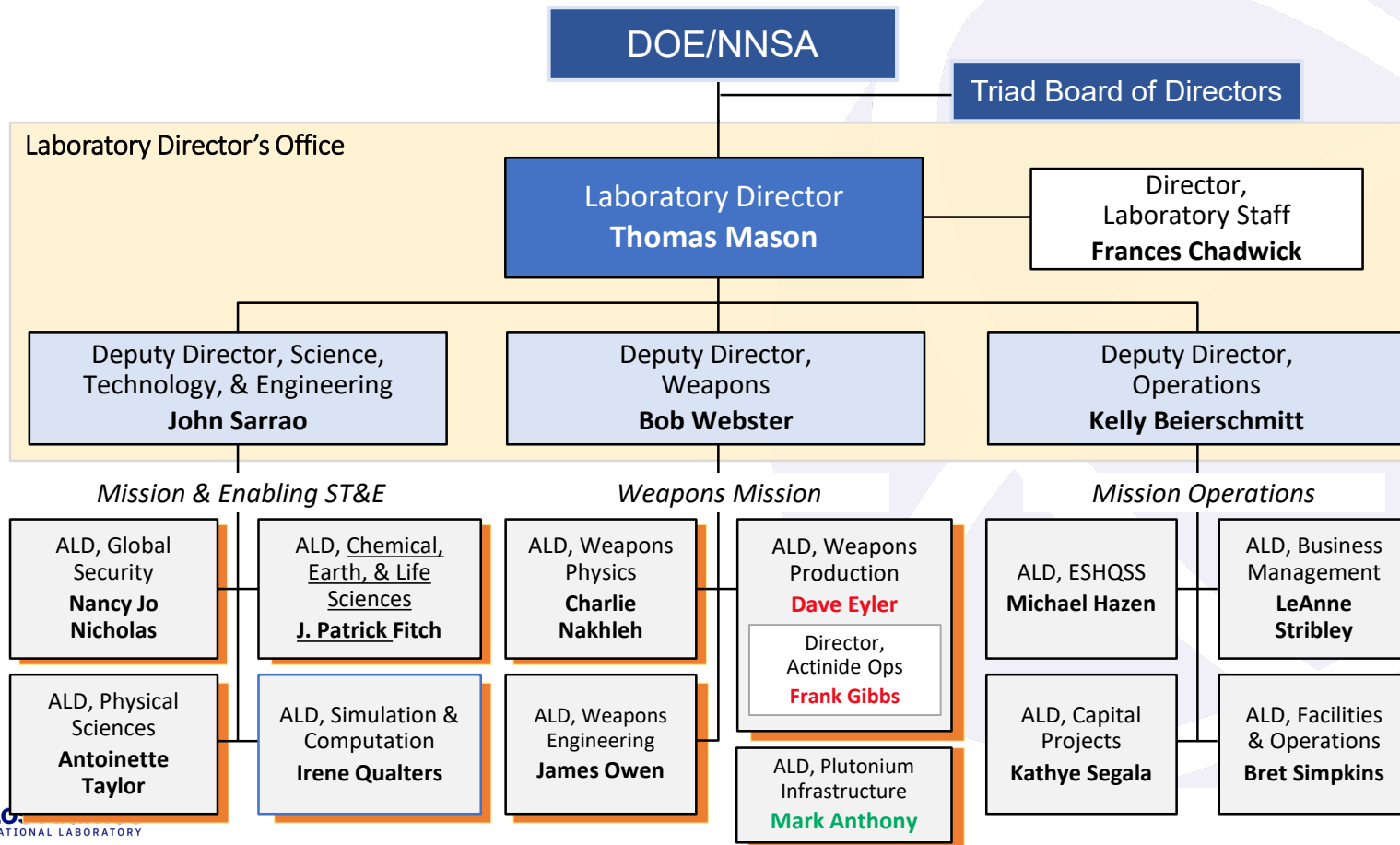
- 8:00 Welcome and Plan for the Day (*closed session*) John Sarrao
- 8:30 NIF Update Kim Scott
TBD
- 9:00 Production Science Innovation Ben Karmiol
TBD
- 9:30 Advanced Manufacturing John Carpenter
TBD
- 10:00 Break
- 10:30 FY22 Lab Agenda/Priority Planing – ALD Roundtable
Attendees: NJ Nicholas, Mike Furlanetto for Toni Taylor, Irene Qualters, Pat Fitch, James Owen, Charlie Nakhleh
- 11:45 Break
- 12:00 Working Lunch with Postdocs (*closed session*) - two sessions: one live, one virtual
- 1:00 Break
- 1:15 Meeting Wrap-up – Final Q&A (*closed session*) John Sarrao
- 2:00 Committee Executive Session (*closed session*) Robert Powell and Committee Members
- 3:00 Meeting Adjourns

Wednesday, Nov. 17, 2021, Outbrief, Webex

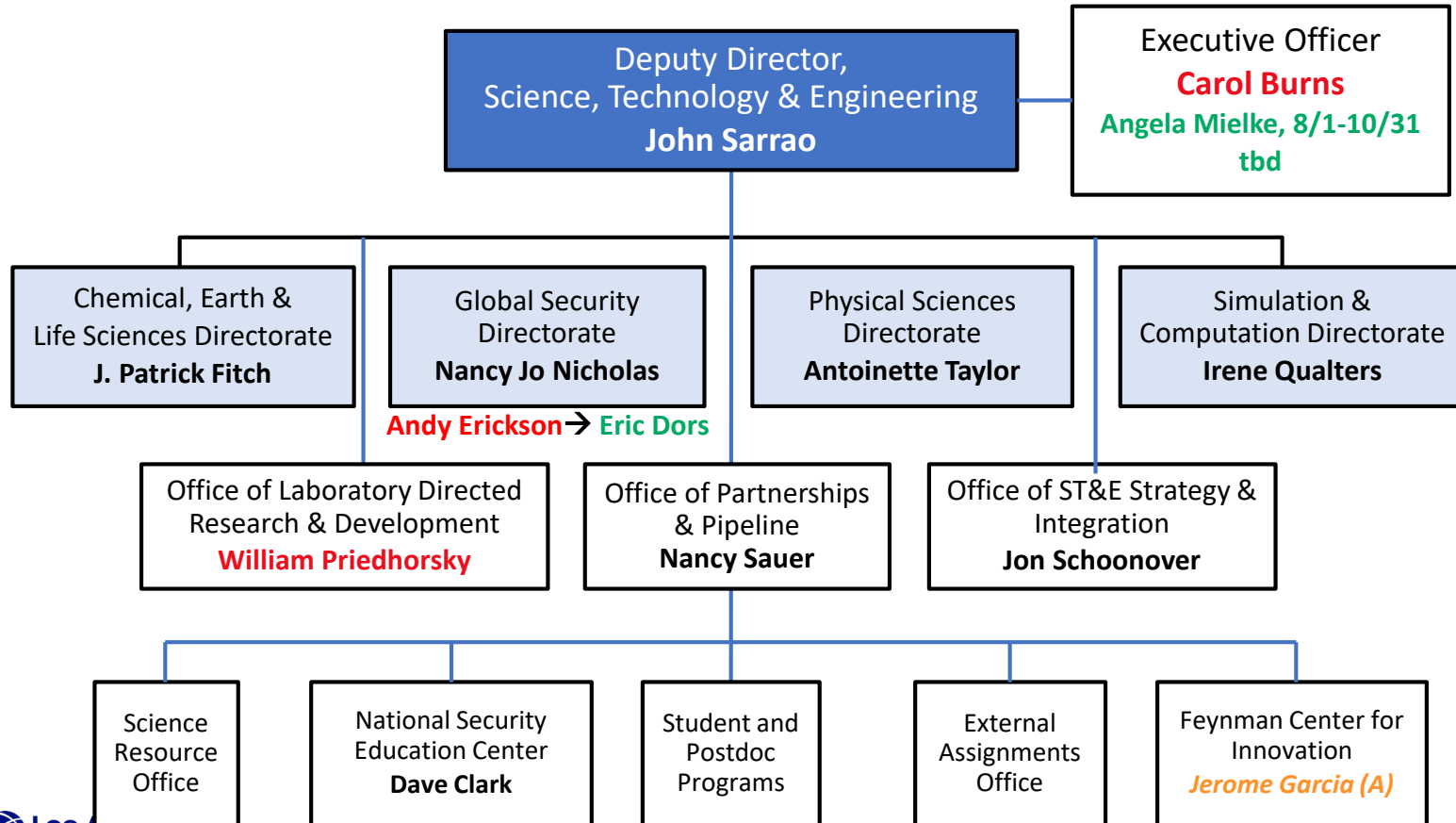
- 1:00 Committee Outbrief (*closed session*) John Sarrao
LANL Leadership Team
Robert Powell and Committee Members
- 2:00 Meeting Adjourns



LANL Organization structure



DDSTE stewards institutional capabilities for the Laboratory



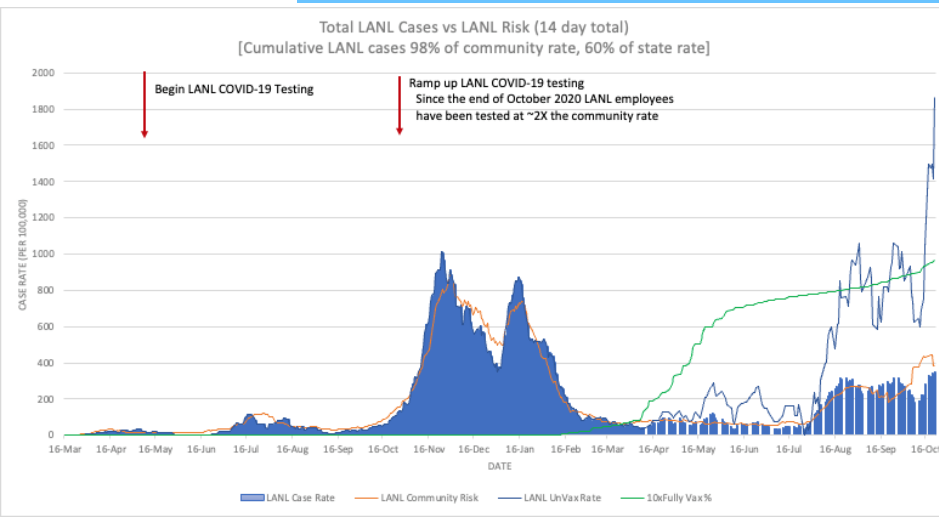
From Thom's 10/21 All Hands: Enabling the mission throughout COVID

- **My ultimate responsibility is to make sure the people of this Laboratory are safe**
 - This is why we determined that masks, social distance, and vaccination were needed for an ALARA work environment
- **~99% of Triad employees will be fully vaccinated**
- **Impacts of the mandate are manageable and not a significant deviation from historical attrition**
- **We will be communicating with employees on vacation/LWOP about important dates and the criteria for returning to work**

185 Separated from Triad

153 Currently on LWOP/vacation with a religious exemption; may return to work when it is safe to do so

26 Medical exemptions



FY21 Performance: Self-Assessment

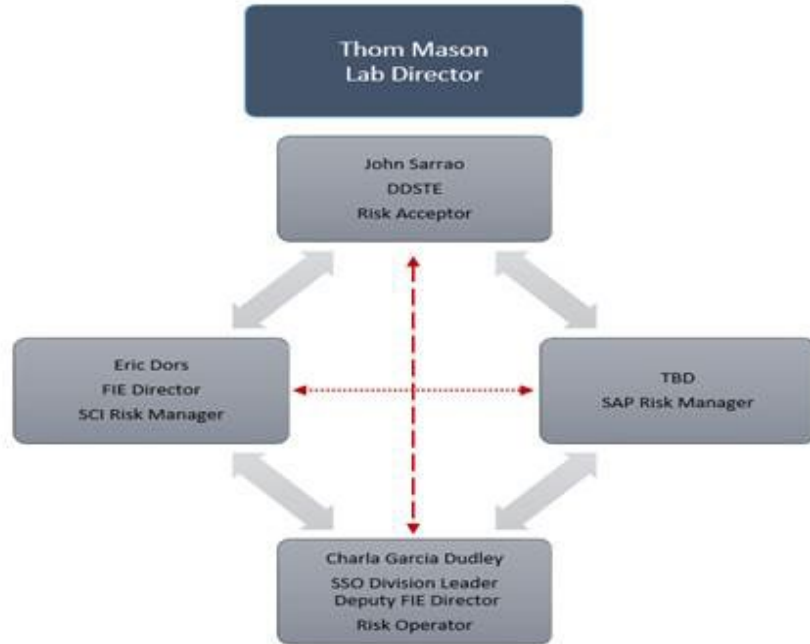
Performance Evaluation and Measurement Plan

- Goal 2: Global Nuclear Security
 - KO2.1: **Convert surplus plutonium to oxide (85 kg vs 125 kg)**
 - KO2.2: **Capability Forward initiative / National Nuclear Materials Archive**
 - KO2.3: **Space nuclear detonation detection requirements, milestones, & delivery dates**
 - *[new in FY22 – KO2.4: Execute minor construction projects at TA-55]*
- Goal 3: **DOE and Strategic Partnership Projects**
- Goal 4: **ST&E Effectiveness (Strategy & Capability)**

Crosscutting Challenges

- Disciplined Operations and Organizational Learning (Cs-137, Low O2, and beyond)
- Governance Partnership and Work Acceptance Workflow
- Actinide Capacity and Integrated Planning

We are actively re-working our special / sensitive risk acceptance approach post-Andy Erickson



Documents being developed/updated

- Risk Acceptance Plan/Process
 - including sub-tier work authorization processes
- SSOOB Charter
- Read-in Matrix, including roles

This framework, including document review, will be a focus at the next Mission Committee meeting, at the appropriate security level.

We welcome ongoing Board interactions.

Our Lab has grown by \$1B in two years

FY21 budget was over \$4B; we expect recent increases to be sustained

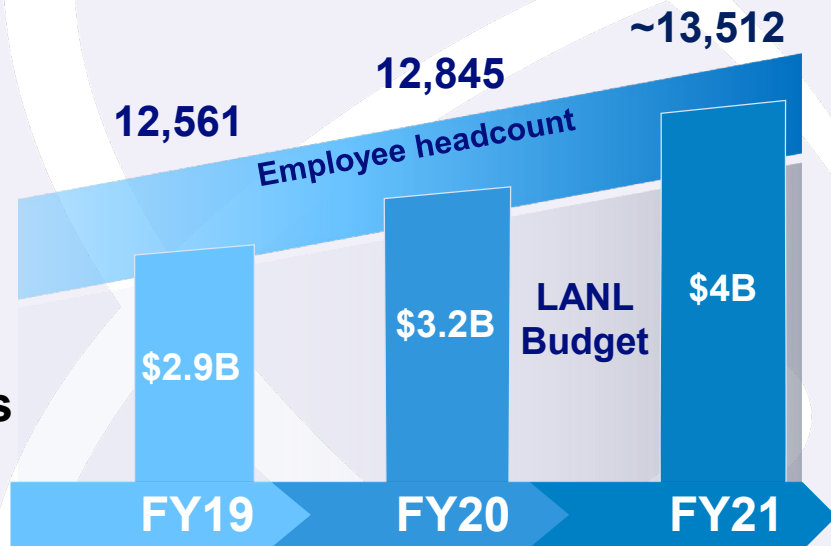
- Continuing resolution is in place until Dec. 3

Managers hired 1,249 reg/term employees

- Reduced hiring cycle from 125 to 69 days
- ALDBUS to launch Lab-wide on-the-spot hiring

Challenge now is to grow our capacity so we can keep pace with budget increases

- Also need to improve operational performance so the number of adverse events does not increase

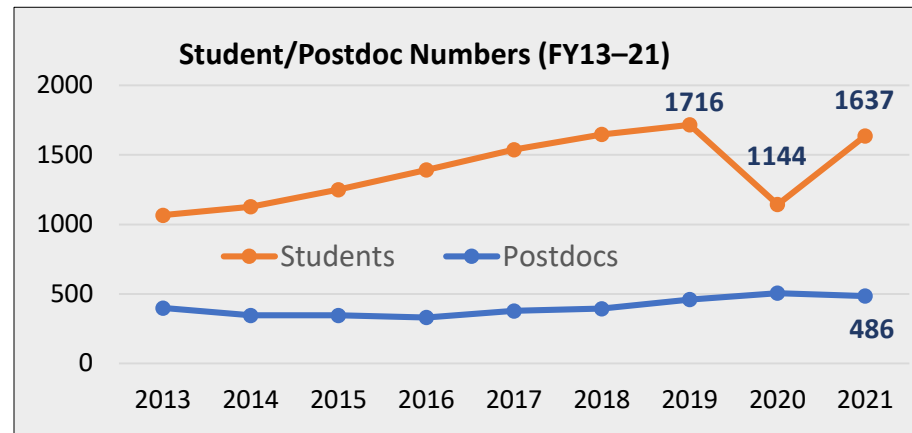


FY21 Performance: Scale

Science Program Area	FY21 BOY	FY21 BA	FY20 BA	Total Funding	FY19 Costs	FY20 Costs	FY21 Costs	FY20 Total FTEs	FY21 YTD FTEs	FY22 BOY
Applied Energy Programs	48,129	33,678	37,073	81,807	35,800	39,306	37,214	109	100	44,593
<i>Applied Energy Integrated Contracts</i>	3,794	426	753	4,220	734	1,198	1,909	4	4	2,311
Civilian Nuclear Programs	10,272	19,140	18,057	29,413	23,740	21,420	16,149	49	33	13,264
<i>Civilian Nuclear Integrated Contracts</i>	11,291	8,899	13,174	20,189	2,337	6,051	10,456	11	19	9,733
Office of Science Programs	94,144	106,424	123,868	200,568	97,140	112,749	107,927	235	242	92,641
<i>Office of Science Integrated Contracts</i>	12,168	24,881	21,225	37,049	17,213	18,157	17,655	45	46	19,394
Total Base Science Programs	179,798	193,449	214,151	373,246	176,963	198,881	191,310	451	444	181,936
Feynman Center For Innovation - SPP (NFE)	19,882	21,210	25,067	41,092	20,884	21,207	23,891	52	54	17,201
Department of Health & Human Services	6,255	10,201	6,436	16,456	6,601	6,264	8,122	17	18	8,334
Total PPO Programs	26,137	31,411	31,503	57,548	27,485	27,471	32,013	68	72	25,535
Nuclear Nonproliferation (NA-20)	99,139	353,893	288,900	453,032	232,258	280,886	303,942	434	423	149,090
Counterterrorism Response (NA-80)	10,964	66,664	53,807	77,627	45,442	50,394	60,097	88	107	17,530
DOE-IN excludes DIR Office portion	4,308	16,788	16,872	21,096	14,256	18,162	14,702	34	28	6,394
Nuclear Energy (AF011 GS portion)	77			77		28	57	0	0	20
SPP (OFA) excludes NIH	161,695	230,643	197,648	392,338	210,389	218,754	216,239	363	356	176,099
<i>Integrated Contracts</i>	4,774	2,888	1,805	7,662		1,613	4,476	3	8	3,186
Total Global Security Programs	280,957	670,876	559,031	951,833	502,344	569,837	599,513	922	922	352,320
Total DDSTE Programs	486,892	895,735	804,685	1,382,626	706,793	796,189	822,836	1,442	1,439	559,790

Focus on people (Nan's talk)

- Hybrid student program successfully realized in 2021
- Summer schools are a unique pipeline to recruit students in key technical areas
- Rigorous postdoc conversion process leads to talented early career staff with key mission skills
- Student programs, pipeline initiatives boost diversity in student pipeline
 - See e.g., [women.lanl.jobs](https://www.lanl.gov/people/women/lanl.jobs)



Postdoc Conversions compared to Non-management PhD Technical Staff Hires (FY16-21)						
	FY16	FY17	FY18	FY19	FY20	FY21 thru Q3
Postdoc Conversions to Scientist and R & D Engineer	79	67	79	85	73	55
Total PhD Non-Management Scientist and R&D Engineer, Levels 1-3 plus PhD GRA & Postdoc Conversions	114	102	110	127	113	78
% of Postdoc Conversions to Total PhD Staff Hires	69%	66%	72%	67%	65%	71%

Bob's Board Report: Final comments and thoughts (1 of 2)

- Efforts to return the Lab to normal operations have resulted in student numbers in 2021 returning to near the pre-pandemic level
- Laboratory and its leadership should continue to actively engage in biosecurity work despite uncertainties in government ownership
- Committee agrees that the Lab has an obligation, not just an opportunity, to be involved in the national reactor enterprise
- Discussion with Group Leaders:
 - Flexibility to establish the work environment post-pandemic
 - Supportive of the need for staff to take vacations to avoid burn-out
 - Timely facility and equipment repair, maintenance, and upkeep
 - Very concerned with timely procurement turnaround

Bob's Board Report: Final comments and thoughts (2 of 2)

- Overwhelmingly positive impression left by the early career staff and the group leaders
- There is a long-term concern with the overall budget and the balance between pit production and ST&E, especially keeping cutting-edge capabilities that enable future missions **[Board and NA-1 resonates]**
- Concerned with the lack of basic science support from funding agencies. This includes a very constrained NNSA RDT&E funding
 - How can the Committee help LANL?
- From the Committee members who contributed to this discussion, there is a sense that today, the Laboratory has built **the** team to oversee its mission and that future hiring must focus on maintaining **the** team and not result in **a** team

FY22 Priorities

- Lab Agenda Critical Outcomes
- Credible Capacity
- Future of Work (and innovation & collaboration)

Lexicon

- **Strategic Objective**

A *strategic objective* is one element of the Laboratory (multi-decadal) vision for what it aspires to achieve.

- **Critical Outcomes**

A *critical outcome* is a defined (measurable) end state, that is essential to one or more strategic objective.

- **Initiative**

An *initiative* is a collection of (coherent) measurable, organized activities undertaken over a roughly five-year time scale necessary to achieve one or more critical outcome.

- **Enabling Action**

An *enabling action* is a measurable, single, near-term activity taken in support of one or more initiative. (indicate needed partnership(s))

Summary of Work Models

ATTRIBUTES	ONSITE STAFF	HYBRID STAFF	TELEWORK STAFF	REMOTE STAFF
Definition	Work location is onsite. Occasional work offsite consistent with current policy.	Some work performed offsite; required to report onsite on a regular and recurring basis. Must be within a two-hour ground commute from the Laboratory.	Most work performed offsite; periodically required to report onsite. Must be within a two-hour ground commute from the Laboratory.	Work performed offsite; infrequent requirements to report onsite. More than a two-hour ground commute from the Laboratory.
Eligibility Work models will be determined, approved and can be changed by management based on the needs of the organization. ALDS will determine the appropriate work models for their organization.	All	All – Must have appropriate management presence for onsite work.	All – Must have appropriate management presence for onsite work.	Depends on circumstances and determined by ALD. Managers are generally not allowed to work remotely except in rare circumstances subject to ALD approval.
Work Location(s)	Regular onsite work – generally no more than 20% time worked offsite per month.	Regular onsite/ offsite work – generally more than 20% time worked offsite. Must be within a two-hour ground commute of the Laboratory.	Work is primarily offsite; generally no regularly scheduled onsite work but required to report onsite with little or no notice. Must be within a two-hour ground commute of the Laboratory.	Periodic onsite work may be required with advance notice. May live out of State. International work requires separate approvals and process.
Onsite Office Space	Individual or shared office space.	Generally shared space with other hybrid staff; utilizes telework-hub space as needed.	Telework-hub space.	Telework-hub space when coming to the Laboratory.
Office Furniture/Equipment	Provided by employer onsite. Employee is responsible for offsite furniture. Technology equipment provided by employer if needed. Special equipment on a case by case basis.	Employee will be provided one ergonomic chair for use either onsite or offsite. Technology equipment provided by employer if needed. Special equipment on a case by case basis.	Ergonomic chair is provided for offsite use. Technology equipment provided by employer if needed. Special equipment on a case by case basis.	Employee is responsible for office furniture. Technology equipment provided by employer if needed. Special equipment on a case by case basis.
Internet Connection	Onsite capability provided by employer.	Employee responsible for alternate work location internet. Must be adequate for productive work.	Employee responsible for alternate work location internet. Must be adequate for productive work.	Employee responsible for alternate work location internet. Must be adequate for productive work.
Approvals	RLM may approve occasional offsite work for Onsite staff.	ALD or delegate approval (ALD may delegate to DL or COO).	ALD or delegate approval (ALD may delegate to DL or COO).	ALD approval required unless international – then DIR (or designee) approval required.

We are re-factoring the Lab Agenda

Announce policy 11/1; Effective 1/1

FY21 Lab Agenda

SIMULTANEOUS EXCELLENCE	1.0 NUCLEAR SECURITY	2.0 MISSION-FOCUSED SCIENCE, TECHNOLOGY & ENGINEERING	3.0 MISSION OPERATIONS	4.0 COMMUNITY RELATIONS
Strategic Objective (10–20 years)	Excellence in Nuclear Security	Excellence in Mission-Focused Science, Technology & Engineering	Excellence in Mission Operations	Excellence in Community Relations
Critical Outcomes (5–10 years)	Design, produce, and certify current and future nuclear weapons and reduce global nuclear threats	Deliver scientific discovery and technical breakthroughs that support DOE and NNSA missions	Execute sustained operations that are reliable and responsive to mission needs	Sustain and enhance LANL's partnership with the community across the Northern New Mexico region
Major Strategic Initiatives (1–5 years)	<p>1.1 Execute LANL's Manufacturing mission to deliver 30 plutonium pits per year</p> <p>1.2 Transform nuclear weapons warhead design and production</p> <p>1.3 Anticipate threats to global security; develop and deploy revolutionary tools to detect, deter, and respond</p> <p>1.4 Support modernization of LANL warhead systems</p> <p>1.5 Assess the stockpile as it ages and project weapon systems lifetimes</p>	<p>2.1 Refresh and refine the LANL capability pillar framework</p> <p>2.2 Advance accelerator science, engineering, and technology to enable future stewardship capabilities</p> <p>2.3 Advance the frontiers of computing to exascale and beyond</p> <p>2.4 Assert leadership in the national quantum initiative</p> <p>2.5 Develop and implement an integrated nuclear energy and nuclear materials initiative</p> <p>2.6 Implement an integrated initiative for plutonium and actinide missions based on FY20 strategy</p> <p>2.7 Implement a national security life sciences initiative</p>	<p>3.1 Change organizational culture with an emphasis on organizational learning</p> <p>3.2 Improve integrated planning across priority mission activities and infrastructure</p> <p>3.3 Address critical issues related to NMCA, nuclear safety, criticality safety, waste, and classified enhancements</p> <p>3.4 Implement systematic process improvement to drive increased rigor and efficiency in work execution</p> <p>3.5 Enhance quality of work life, workforce planning, and training and development</p>	<p>4.1 Continue commitment to the community with educational, economic, and philanthropic investments of time and resources</p> <p>4.2 Strengthen pipelines and partnerships to build workforce of the future</p> <p>4.3 Enhance small business participation in executing LANL scope across all directorates</p> <p>4.4 Demonstrate agility and flexibility in our partnerships, effectively balancing benefit and risks</p>

2021 Capability Review status

Topic	SOS	NPF	CNES	Engineering	Materials	IS&T	Weapons Systems
Dates; Mode	3/2 – 3/4 virtual	5/3-5/4 hybrid	5/5-5/7 virtual	6/29-7/1; hybrid w/ classified session	6/21-6/23 hybrid w/ classified session	Wk of 7/12; hybrid (3 6-hour days)	8/23-8/26; live
RALD	ALDCELS	ALDPS	ALDCELS	ALDGS	ALDPS	ALDSC	ALDX/ALDWP
Tech POC	A. Wolfsberg	B. Albright, R. Leeper	J. Szymanski	NJ Nicholas; J.Szymanski	E. Cerreta, A. Dattelbaum	Irene Qualters	R. Putnam
Scope	Broad	HEDPF	National Security Life Science Strategy	Nuc. Eng. & Eng. Leadership Council, Eng. Institute	Integrated Nano; Actinides/Corr e-Materials	Computational Science	Manufacturing/ Production
Committee Chair	Glenn Sjoden	Bob Rosner	Bruce Warner	Bill Barletta (2021)/Joan Woodard(2022);	Grant Heffelfinger	Bruce Hendrickson	John Immele
Committee Members	Sara Pozzi Jim Brase Gregory Beroza Gregory Armstrong Randy Bell Doris Bruner Jenifer Shafer	Barbara Jacak Carolyn Kuranz Keith Matzen Sean Regan Arindam Banerjee Mark Herrmann Karl van Bibber	Marianne Walck Paul Gilna Randy Gentry Rita Colwell Cynthia Rozenzweig Dylan George Chris Keane Jacqueline Fletcher	Rita Baranwal Shannon Bragg-Sitton David Miller John Hurtado Joan Woodard Sunil Chirayath Bill Charlton Anup Singh	Kathi Alexander Bob Maxwell Clare Yu Michael Demkowicz Pat Allen Mike Norman Rachel Goldman	Jonathan Carter Sandy Landsberg Alex Loddock Juan Meza S. Bala Balachandar	Kathi Alexander Steve Guidice Charlie McMillan Mark Martinez Paul Dunn Deneice Korzekwa Al Romig
STEC Observers	Jeanloz, Eardley	Yennello	Murray, Jeanloz, Frincke	Banks, Murray, McCallen	Pollock, Hemminger	Simon, Yennello, Frincke	Eardley Adams (M)

Capability review highlights, takeaways, and process next steps

- More effective virtual & hybrid meetings; “lightning talks” a big success; some gaps on context due to classification; hoping for 7 “live” reviews in 2022
- No concerns on technical quality/significance of work
- Staff, especially early career & post-doc, surprisingly strong. Some collaboration/integration gaps and sense of lack of “free energy”; housing a growing issue
- Mentoring improving; legitimate concerns about sustainability of scale
- ST&E Committee will close out annual process in November



Capability review highlights, takeaways, and process next steps

Wpns Sys: Actinide Manufacturing Capability $\leftarrow \rightarrow$ Materials

The research we saw was clearly supportive of the actinide manufacturing mission, and, if it continues along similar lines, will serve the *laboratory* and the Nation well into the future. In addition, the laboratory appears to be realizing the gains of being both a design agency and a production agency. While it is critical that these roles remain separate and distinct, it is very appropriate for the lab to bring its long history of research excellence to bear on production and operational problems in ways that are possible only at one of the world's great research institutions.

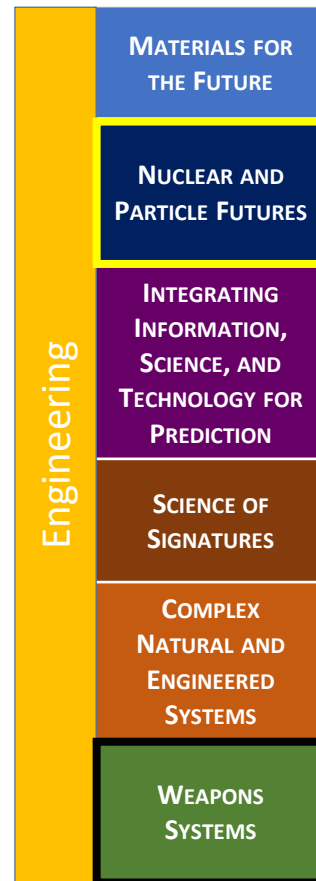
- Challenge of balancing long-term Pu Center of Excellence and near-term translation to practice
 - interface with materials: manufacturing science & actinide materials
- Concern re: scale of staffing needs
- Encouragement to focus on footprint minimization (separations techniques, waste, mc&a monitoring)

NPF: High Energy Density, Plasmas, and Fluids $\leftarrow \rightarrow$ ICF Strategy

The “bottom line” for ICF/HED research at LANL: we applaud the new emphasis (*goal to double ICF scope; focus on double shells*), and strongly urge LANL to persist and to grow in this domain. This is the time to do this, as NNSA's ICF/HED program itself reassesses and is poised to grow substantially — this is an opportunity not to be missed.

- Some concerns re: strategy-capability alignment (due in part to hybrid, non-classified format)

IS&T: Excited about NVIDIA technology strategy AND need to consider portability and risk mitigation



Topics for discussion

- Overall plan for meeting
- Lab Updates
- What you told us last time (June 2021); Bob's Board briefing (10/20/21)
- FY22 Priorities
- Capability Stewardship
- **Scheduling 2022 ST&E Committee Meetings**
 - Board: March 1 & 2, May 23 & 24, Oct. 18 & 19
 - Capability Reviews: March – July
 - Santa Fe meeting venue
- **Questions**